

## CHAPTER 4

# STACK EMISSION REGULATIONS AND THE PERMITTING PROCESS

### 4-1. Stack emissions

The discharge of pollutants from the smokestacks of stationary boilers and incinerators is regulated by both Federal and State Agencies. A permit to construct or modify an emission source will almost certainly be required.

*a.* The emissions must comply with point source regulations, dependent upon characteristics of the point source, and also with ambient air quality limitations which are affected by physical characteristics of the location and the meteorology of the area of the new source.

*b.* The permitting procedure requires that estimates be made of the effect of the stack emissions on the ambient air quality. Predictive mathematical models are used for arriving at these estimates.

*c.* Due to the time requirements and the complexity of the process and the highly specialized nature of many of the tasks involved, it is advisable to engage consultants who are practiced in the permitting procedures and requirements. This should be done at a very early stage of planning for the project.

### 4-2. Air quality standards

*a. Federal Standards* — Environmental Protection Agency Regulations on National Primary and Secondary Ambient Air Quality Standards (40 CER 50).

*b. State standards.* Federal installations are also subject to State standards.

### 4-3. Permit acquisition process

*a. New Source Review.* The state agency with jurisdiction over pollution source construction permits should be contacted at the very beginning of the project planning process because a New Source Review (NSR) application will probably have to be filed in addition to any other State requirements. A New Source Review is the process of evaluating an application for a "Permit to Construct" from the Air Quality Regulatory Agency having jurisdiction.

*b. Planning.* Consideration of air quality issues very early in the planning process is important because engineering, siting, and financial decisions will be affected by New Source Review. Engineering and construction schedules should include the New Source Review process which can take from 6 to 42 months to complete and which may require the equivalent of one year of monitoring ambient air quality before the review process can proceed.

*c. Emission levels.* One must file for a New Source Review application if, after use of air pollution control equipment, the new boiler or incinerator will result in increased emissions of any pollutant greater than a specified limit. Proposed modifications of existing boilers and incinerators that will cause increases in pollutant emissions greater than certain threshold levels ("de minimis" emission rate) require New Source Review.

*d. General determinants for steps required for permitting.* Steps required for a New Source Review depend upon the location of the new source, characteristics of the other sources in the area, and on discussions with the State Air Pollution Control Agencies, possibly the EPA, and how well one is current with the changes in regulations and administrative practices. Because of the constantly changing picture, it is usually very beneficial to engage an air quality consultant to aid in planning permitting activities.

*e. Technical tasks.* The principal technical tasks that are required for the permitting effort in most cases may be summarized as follows:

- (1) Engineering studies of expected emission rates and the control technology that must be used.
- (2) Mathematical modeling to determine the expected impact of the changed emission source.
- (3) Collection of air quality monitoring data required to establish actual air quality concentrations and to aid in analysis of air quality related values. All technical tasks are open to public questioning and critique before the permitting process is completed.

*f. New Source Review program steps.* The steps required in a New Source Review vary. However, it is always required that a separate analysis be conducted for *each* pollutant regulated under the Act. Different pollutants could involve different paths for obtaining a permit, and may even involve different State and Federal Agencies.

- (1) *Attainment or nonattainment areas.* A concern which must be addressed at the beginning of a New Source Review is whether the location is in a "nonattainment" or "attainment" area. An area where the National Ambient Air Quality Standards (NAAQS) are not met is a "nonattainment" area for any particular pollutant exceeding the standards. Areas where the National Ambient Air Quality Standards (NAAQS)

that are being met are designated as an "attainment" area. Designation of the area as "attaining", or "nonattaining", for each pollutant encountered determines which of the two routes is followed to procure a permit. Note that the area can be attaining for one pollutant and nonattaining for another pollutant. If this occurs one must use different routes for each of the pollutants and would have to undertake both "prevention of significant deterioration" (PSD) and "nonattainment" (NA) analyses simultaneously.

- (2) *Attainment area.* If the proposed source is in an "attainment" area, there is a specified allowed maximum increase, or "increment", of higher air pollutant concentrations. The upper limit of this increment may be well below the prevailing National Ambient Air Quality Standard (NAAQS). The "increment" concept is intended to "prevent significant deterioration" of ambient air quality. The new source might be allowed to consume some part of the increment' as determined by regulatory agency negotiations.
- (3) *Nonattainment area.* If the proposed new source is in a "nonattainment" area, it may have to be more than off-set by decreases of emissions from existing sources, resulting in air cleaner after addition of the new source than before it was added. In the absence of pollutant reductions at an existing source which is within administrative control, it may be necessary to negotiate for, and probably pay for, emission reductions at other sources.
- (4) *Summary of permitting path.* The steps listed below present a summary of the permitting steps:
  - (a) Formulate a plan for obtaining a construction permit. It is usually advisable to engage a consultant familiar with the permitting procedures to aid in obtaining the permit.
  - (b) Contact state regulatory agencies.
  - (c) Determine if the modification could qualify for exemption from the New Source Review process.
  - (d) Determine if the proposed facility will be considered a "major source" or "major modification" as defined by the regulations.
  - (e) Determine if, and how, with appropriate controls, emissions can be held to less than "de minimis" emission rates for the pollutant so New Source Review procedures might be avoided.

- (f) Consider the questions related to prevention of significant deterioration and nonattainment. If it is found the facility will be a major source, determine for which areas and pollutants you will have to follow PSD rules. Determine possible "off-sets" if any will be required.
- (g) List the tasks and steps required for a permit and estimate the costs and time increments involved in the review process. Coordinate the New Source Review schedule with the facility planning schedule and determine how the New Source Review will affect construction plans, siting, budgetary impact, schedules and the engineering for controls technology.

#### 4-4. Mathematical modeling

*a. Modeling requirement.* Air quality modeling is necessary to comply with rules for proposed sources in both attaining and nonattaining areas. Modeling is a mathematical technique for predicting pollutant concentrations in ambient air at ground level for the specific site under varying conditions.

*b. Modeling in attainment areas.* Modeling is used, under PSD rules, to show that emissions from the source will not cause ambient concentrations to exceed either the allowable increments or the NAAQS for the pollutant under study. It may be necessary to model the proposed new source along with others nearby to demonstrate compliance for the one being considered.

*c. Modeling in nonattainment areas.* Modeling is used to determine the changes in ambient air concentrations due to the proposed new source emissions and any off-setting decreases which can be arranged through emissions reduction of existing sources. The modeling then verifies the net improvement in air quality which results from subtracting the proposed off-sets from the new source emissions.

*d. Monitoring.* Modeling is also used to determine the need for monitoring and, when necessary, to select monitoring sites.

*e. Guideline models.* EPA's guideline on air quality recommends several standard models for use in regulatory applications. Selection requires evaluation of the physical characteristics of the source and surrounding area and choice of a model that will best simulate these characteristics mathematically. Selection of the proper model is essential because one that greatly over-predicts may lead to unnecessary control measures. Conversely, one that under-predicts ambient pollution concentration requires expensive retrofit control measures. Because of the subtleties involved, it is usually advisable to consult an expert to help select and apply the model.

#### **4-5. Monitoring**

For a New Source Review, monitoring may be required to obtain data which shows actual baseline air quality concentrations. If monitoring is required, prepare a monitoring plan that includes monitor siting, measurement system specifications, and quality assurance program design. Once the plan is ready, it should be reviewed with the relevant agencies.

#### **4-6. Presentation and hearings**

After a New Source Review application is prepared, it must be reviewed with the appropriate agency. Often a public hearing will be necessary and the application will have to be supported with testimony. At the hearing, all phases of work will be subject to public scrutiny and critique.

#### **4-7. Factors affecting stack design**

*a.* Design of the stack has a significant effect on the resulting pollutant concentrations in nearby ambient air. Stack emission dispersion analysis is used to determine increases in local air pollution concentrations for specific emission sources. Factors which bear upon the design of stacks include the following:

- Existing ambient pollutant concentrations in the area where the stack will be located
- Meteorological characteristics for the area
- Topography of the surrounding area

*b.* Specific regulations having to do with stack design have been promulgated by the EPA to assure that the control of air pollutant shall not be impacted by stack height that exceeds "good engineering practice" or by any other dispersion technique. These regulations have a direct bearing on the specific location and height of a stack designed for a new pollution source.